

Patent Application
10/010,162

REMARKS

Claims 12-22 are now pending in the application. Claims 1-11 have been canceled. Independent Claim 12 has been amended. Independent Claim 22 has been added. Claims 12 and 22 are the only independent claims.

The drawings were objected to because "the lines and numbers defining the drawings are blurred and not clearly legible". New informal drawings are submitted herewith that provide clear lines and numbers. In addition, formal drawings will be submitted upon allowance of the application.

Claims 1-9 and 11-20 were rejected under 35 USC 102(b) as being anticipated by US Patent 5,283,201A (Tsang et al.) and Claims 10 and 21 were rejected under 35 USC 103(a) as being unpatentable over Tsang. In view of the foregoing claim amendments and the following discussion, each of the rejections is respectfully traversed and reconsideration is requested.

Independent Claim 12 is directed to a method of forming a trench MOSFET including providing a semiconductor wafer of a first conductivity type, depositing an epitaxial layer of the first conductivity type over the wafer, the epitaxial layer having a lower majority carrier concentration than the wafer, forming a body region of a second conductivity type within an upper portion of the epitaxial layer, providing a patterned first masking material layer over the epitaxial layer, the patterned first masking material layer comprising a first aperture, depositing a second masking material layer over the first masking material layer, etching the second masking material layer until a second aperture is created in the second masking material layer within the first aperture, the second aperture being narrower than the first aperture, forming a trench in the epitaxial layer by etching the semiconductor wafer through the second aperture, forming an insulating layer lining at least a portion of the trench, forming a conductive region within the

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trench adjacent the insulating layer and forming a source region of the first conductivity type within an upper portion of the body region and adjacent the trench. Claim 12 as amended further recites that a *lateral thickness of said source region is independent of the measurement of the distance between the first and second apertures.*

Tsang is directed to a method of making a recessed gate field effect power MOS device and uses a "sidewall spacer on the trenching protective layer to control lateral extent of the pinched P-base width" (col. 4, lines 4-6). As recited at col. 6, lines 48-50, "lateral thickness 52 of the sidewall spacers partially determines the eventual lateral thickness of the source regions as formed in FIG. 11". Also, recited at col. 7, lines 60-62, "N+ source layers 86 having a lateral thickness 88 that is approximately equal to the difference between the thickness 52 of the sidewall spacers (see FIG. 5) and about half of the thickness 66 of the gate oxide layer".

For at least the foregoing reason, it is respectfully submitted that amended independent Claim 12 is patentable over Tsang and reconsideration is requested.

Independent Claim 22 is directed to a method of forming a trench MOSFET including the steps recited in original Claim 12, but further recites, after the step of forming a trench in the epitaxial layer by etching the semiconductor wafer through the second aperture, removing the first masking material layer and the second masking material layer.

In Tsang's recessed gate field effect power MOS device, "vertical N-type layers 86 are vertically aligned spacers 44' which "serve together with oxide plugs 68 in the final device to isolate the source metal 94 from the gate polysilicon 62" (col. 9, lines 26-29).

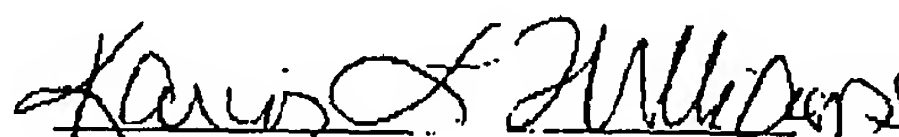
Tsang provides no teaching or suggestion of a method in accordance with Applicant's Claim 22 in which a step of "removing the first and second masking material layers" is performed after forming a trench, and before forming an insulating layer lining at least a portion of the trench, forming a conductive region within the trench adjacent the insulating layer and forming a source region of said first conductivity type within an upper portion of the body region and adjacent the trench.

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For at least the foregoing reason, it is respectfully submitted that amended independent Claim 22 is patentable over Tsang and reconsideration is requested.

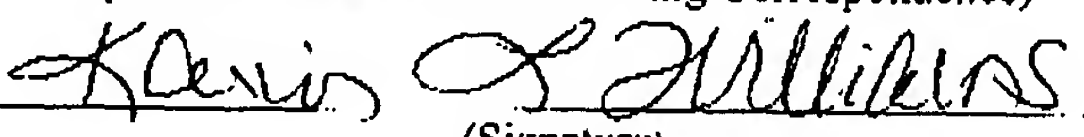
Dependent Claims 13-21 are believed to be clearly patentable for all of the reasons indicated above with respect to Claim 12, from which they depend, and even further distinguish over Tsang by reciting additional limitations. Should the Examiner be of the view that an interview would expedite consideration of the application, request is made that the Examiner telephone the Applicants' attorney at (908) 518-7700 in order that any outstanding issues be resolved.

Respectfully submitted,



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<p>Certificate of Facsimile Transmission I hereby certify that this document and any document referenced herein has been transmitted via facsimile to the US Patent and Trademark Office at (703) 872-9318 on <u>October 13, 2003</u>.</p> <p><u>Karin L. Williams, Reg. No. 36,721.</u> (Printed Name of Person Mailing Correspondence)</p> <p> (Signature)</p>
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